

Chapter 7, Bonding Objectives

Terms:

octet rule	formal charge	triple bond
ionic bond	non polar covalent bond	lone pairs
ionic compound	polar covalent bond	bonding pair
isoelectronic	valence shell electron	hybrid orbitals
electronegativity	repulsion model	sigma bond
covalent bond	crystal	pi bond
resonance	single bond	
resonance structures	double bond	

You should be able to:

1. explain how and why ionic bonds and covalent bonds form,
2. classify bonds and compounds as ionic or covalent (molecular) and if covalent (molecular) classify them as polar or nonpolar,
3. write the formula for an ionic compound given a metal and nonmetal,
4. write a reaction equation showing the formation of a given ionic compound from its elements,
5. given a list of atoms arrange them in order of increasing electronegativity,
6. describe the relationship between bond length, bond strength, and the number of bonds,
7. show the charge distribution within a molecule,
8. write Lewis structures (include any resonance forms),
9. given more than one valid Lewis structure for a given species, assign formal charges and indicate the most likely structure,
10. given a list of bonds, arrange them in order of increasing bond polarity,
11. indicate the designation for the hybrid orbitals formed from the combination of given orbitals and give the bond angles associated with each,
12. describe the formation of hybrid orbitals and draw simple diagrams representing them and also show any unhybridized orbitals,
13. given a molecule or ion:
write the Lewis structure,
predict the molecular shape including bond angles,
draw the 2-D representation of the 3-D shape,
give the hybridization for each atom,
predict the overall polarity,
determine the total number of sigma and pi bonds,
14. given a molecule indicate which atoms lie in the same plane if any,
15. explain how pi bonding prevents rotation around bonds,
16. compare the characteristics of sigma and pi bonds in terms of the spatial distribution of electron density and be able to sketch them,
17. show how p atomic orbitals can combine to form sigma and pi molecular orbitals,